Module 1

Introduction to Coastal GIS

NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Module Introduction

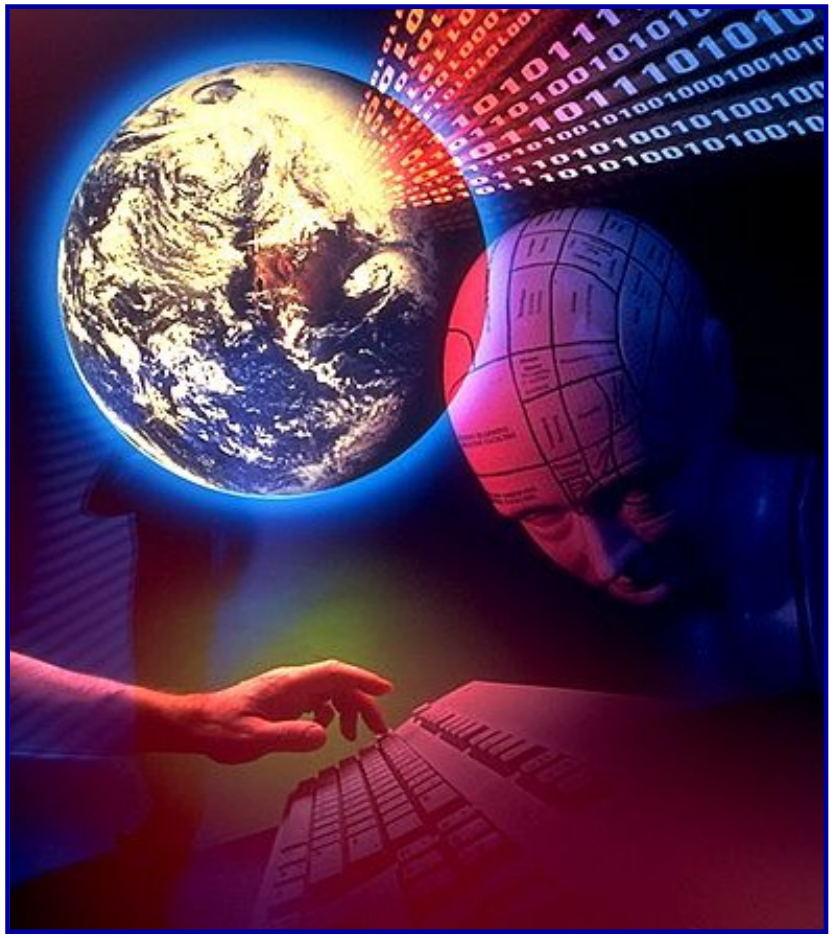
- Since the mid-1990's, GIS has played an ever increasing role in coastal resource management.
- The rise of the Internet has provided GIS users with a convenient medium for sharing and accessing geospatial data.
- Proper data management practices are the key to ensuring the functionality of your GIS data sets and analyses.

Module Overview

1. **Introduction** Overview, GIS Theory, and the Study Area
2. **Exercise A** Find and Import Data
3. **Lecture** Introduction to Metadata
4. **Exercise B** Using Metadata to Determine Suitability

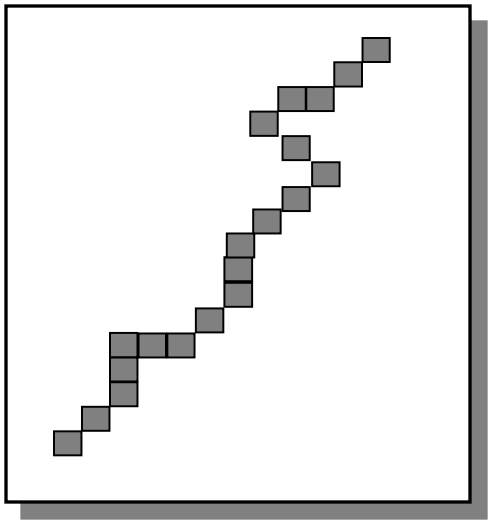
Coastal GIS

- **Geographic Information Systems (GIS) provide the coastal resource management community with an opportunity to**
  - Examine the effects of population growth on natural resources
  - Create protected areas for habitat management
  - Examine the spatial distribution of species over time
  - Create and update marine boundaries
  - Perform hazards management
  - Other issues?
- **We would not be able to use GIS without accurate geospatial data**



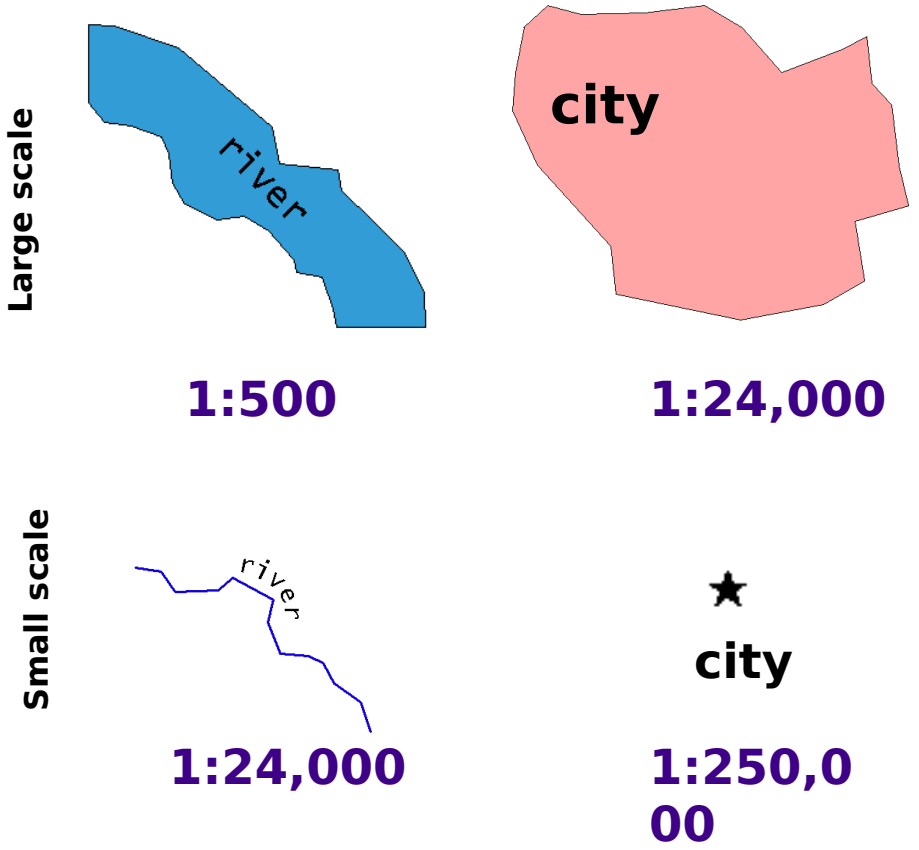
Data Formats

- **Vector Datasets**
  - A representation of a spatial phenomenon as a series of points, lines, or areas
  - Points are referenced to a spatial coordinate system, lines to points, and areas to their lines
  - Each entity has an ID, which is linked to attribute data in a separate database file
- **Raster Datasets**
  - A representation of a spatial phenomenon as a series of grid cells, or pixels.
  - Point phenomena are represented as single cells, lines as a series of connected cells, and areas as groups of connecting cells
  - Each pixel has an associated value or array of values



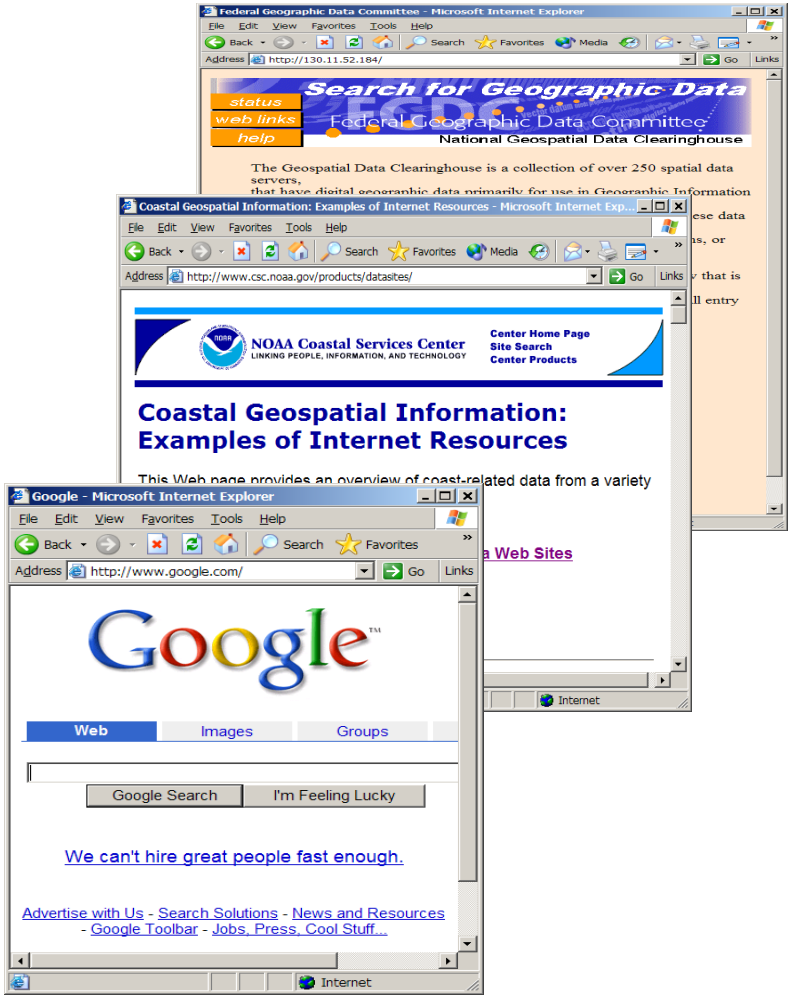
Scale

- Remember, spatial data sets are only representations of real-world phenomenon
- Scale determines the size and shape of features in a GIS
- At larger scales, many spatial phenomena are represented as areas
- As you decrease the scale of the map, many phenomena are represented as points or lines



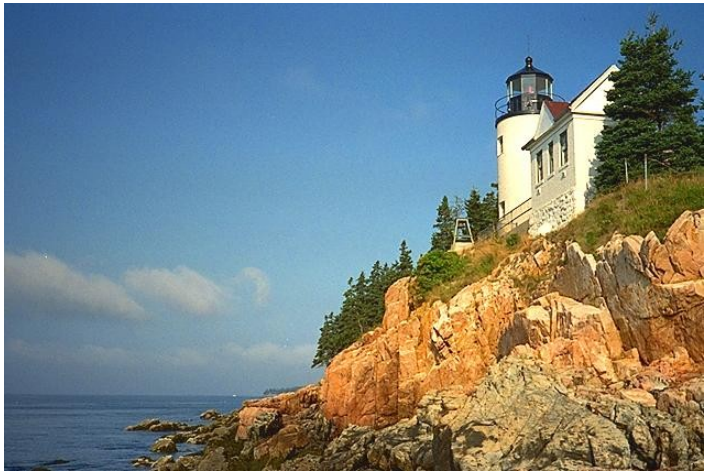
Accessing Geospatial Data

- **It is possible today to access vast amounts of geospatial data over the Internet**
- **Sources include search engines, existing lists and collections, and clearinghouses**
- **There are hurdles with data obtained online:**
  - Locating it
  - Cost
  - Accuracy
  - Format
  - And others…


Federal Geographic Data Committee - Microsoft Internet Explorer
Search for Geographic Data
Federal Geographic Data Committee
National Geospatial Data Clearinghouse
Coastal Geospatial Information: Examples of Internet Resources - Microsoft Internet Exp...
NOAA Coastal Services Center
Coastal Geospatial Information:
Examples of Internet Resources
Google - Microsoft Internet Explorer
Google
Web
Images
Groups
Google Search
I'm Feeling Lucky
We can't hire great people fast enough.
Advertise with Us - Search Solutions - News and Resources
- Google Toolbar - Jobs, Press, Cool Stuff...

Maine Coastline and Population

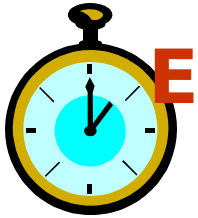
- Physical Geography
- Conservation
- Diverse Ecology and Economy



Exercise A: Find and Import Data

What to Expect:

In this exercise, you will use many different methods to access sources of geospatial data over the Internet. Once you have accessed the data, you will download it and prepare it for integration into ArcView 8.



Estimated Length: 45 Minutes

Discussion: Spatial Data Acquisition

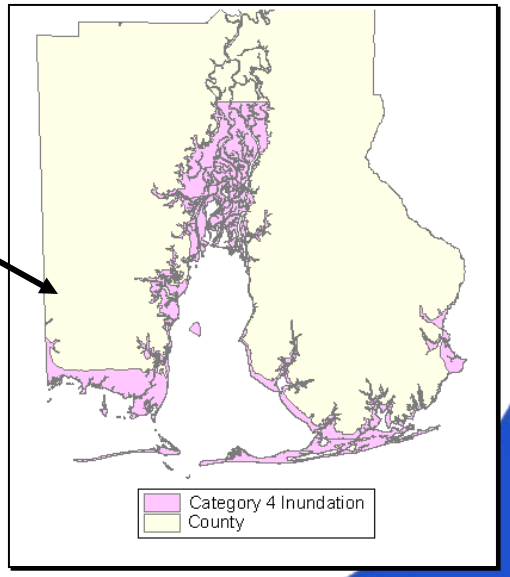
- *What data sources would be useful to compile base layers for coastal management?*
- *Have you ever had any data that you could not use in your GIS because they were not in the proper format?*
- *What are some other data issues you should consider?*

What is Metadata?

- **Metadata is data about data**
- **Metadata describes the characteristics of the data**
  - Who produced it
  - How it was produced
  - The currentness of the data
  - The spatial parameters of the dataset
  - Feature and attribute information
  - Plus much more…
- **Without proper documentation, no dataset is complete**

```
Identification_Information
  Citation
  Citation_Information
    Originator: NOAA Coastal Services Center
    Publication_Date:  19971131
    Title: Hurricane Storm Surge
    Geospatial_Data_Presentation_Form: Map
    Publication_Information
      Publication_Place: Charleston, SC
      Publisher: NOAA Coastal Services Center
    Larger_Work_Citation
      Citation_Information
```

<u>This</u> is a small part of the metadata for <u>this</u>.



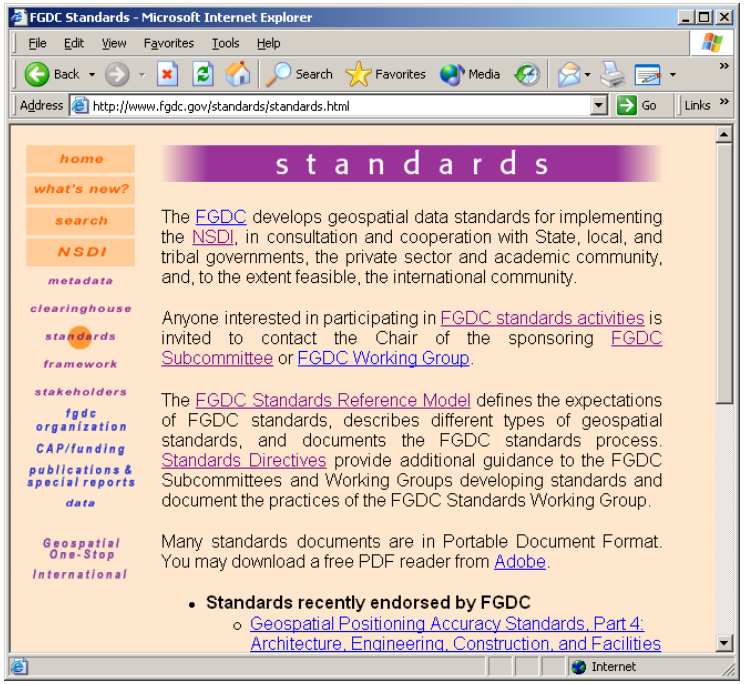
Who Benefits from Metadata?

- **For DATA DEVELOPERS, metadata helps…**
  - Avoid duplication
  - Share reliable information
  - Publicize efforts
  - Reduce workload
- **For DATA USERS, metadata…**
  - Facilitates understanding
  - Focuses on key elements
  - Enables discovery
- **For ORGANIZATIONS, metadata helps…**
  - Protect investments
  - Create an institutional memory
  - Allow sharing of data with other agencies
  - Reduce costs
  - Limit potential liability

Metadata Standards

- **Think for a moment how hard it would be to…**
  - Bake a cake without standard units of measurement
  - Put gas into your car without standard nozzle sizes
  - Plug a lamp into a socket without standard electrical outlets

- **A metadata standard ensures a level of consistency for data documentation.**


FGDC Standards - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.fgdc.gov/standards/standards.html
Go Links
home
what's new?
search
NSDI
metadata
clearinghouse
standards
framework
stakeholders
fgdc organization
CAP/funding
publications & special reports
data
Geospatial One-Stop
International
standards
The FGDC develops geospatial data standards for implementing the NSDI, in consultation and cooperation with State, local, and tribal governments, the private sector and academic community, and, to the extent feasible, the international community.
Anyone interested in participating in FGDC standards activities is invited to contact the Chair of the sponsoring FGDC Subcommittee or FGDC Working Group.
The FGDC Standards Reference Model defines the expectations of FGDC standards, describes different types of geospatial standards, and documents the FGDC standards process. Standards Directives provide additional guidance to the FGDC Subcommittees and Working Groups developing standards and document the practices of the FGDC Standards Working Group.
Many standards documents are in Portable Document Format. You may download a free PDF reader from Adobe.
Standards recently endorsed by FGDC
Geospatial Positioning Accuracy Standards, Part 4: Architecture, Engineering, Construction, and Facilities
Internet

http://www.fgdc.gov/standards/standards.html

FGDC

- **Federal Geographic Data Committee**
- **Organized in 1990 under the Office of Management and Budget**
- **Promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis**

"Federal agencies and organizations receiving federal funds ***must document all geospatial data* using the FGDC Content Standard for Digital Geospatial Metadata (CSDGM)."**

-Executive Order 12906, 1995

Content Standard

- **CSDGM – Content Standard for Digital Geospatial Metadata**
- **Serves as a uniform summary description of the data set**
- **Establishes names of data elements and compound elements**
- **Defines information about values provided for data elements**

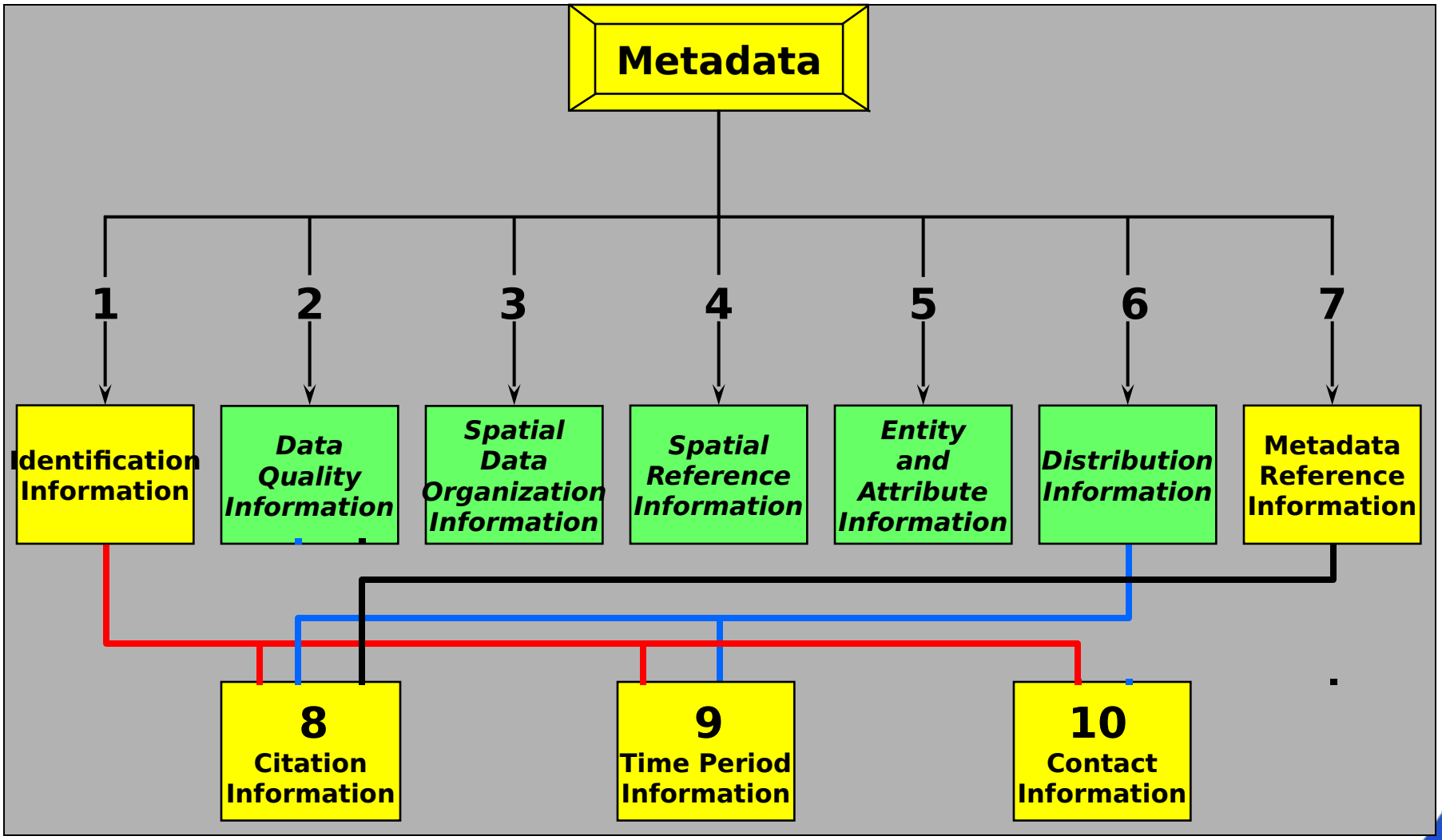
The Content Standard utilizes…

- **Common terms**
- **Common definitions**
- **Common language**
- **Common structure**

The Content Standard helps the user determine…

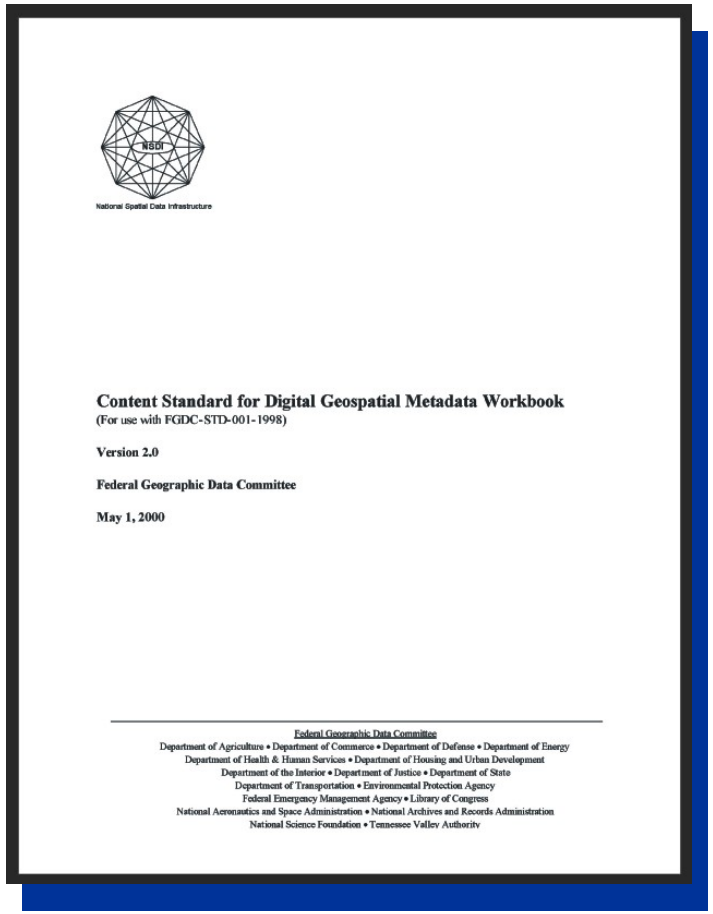
- **If a set of geospatial data is available and fit for a particular use**
- **How to access and transfer the data set**

Content Standard



FGDC's Metadata Workbook

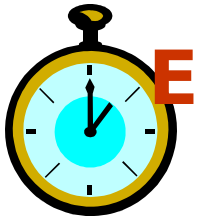
- Defines the 334 metadata elements.
- Consult this document for detailed instructions on how to fill out metadata.
- Can be found on-line: www.fgdc.gov/metadata/meta_workbook.html


NSDI
National Spatial Data Infrastructure
Content Standard for Digital Geospatial Metadata Workbook
(For use with FGDC-STD-001-1998)
Version 2.0
Federal Geographic Data Committee
May 1, 2000
Federal Geographic Data Committee
Department of Agriculture • Department of Commerce • Department of Defense • Department of Energy
Department of Health & Human Services • Department of Housing and Urban Development
Department of the Interior • Department of Justice • Department of State
Department of Transportation • Environmental Protection Agency
Federal Emergency Management Agency • Library of Congress
National Aeronautics and Space Administration • National Archives and Records Administration
National Science Foundation • Tennessee Valley Authority

Exercise B: Using Metadata to Determine Suitability

What to Expect:

In this exercise, you will review the metadata that you downloaded with data sets in the previous activity. You will use the metadata to answer questions and determine the suitability of the associated data sets in your current project.



Estimated Length: 30 Minutes

Discussion: Data Suitability Determination

- *Which dataset did you choose for each project?*
- *What are the pros and cons of various resolutions of data?*